Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
UMTRI-2015-33		

4. Title and Subtitle	5. Report Date
Should We Require Licensing Tests and Graduated Licensing for Self-Driving Vehicles?	October 2015
	6. Performing Organization Code 383818

7. Author(s)	8. Performing Organization Report No.
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9. Performing Organization Name and Address	10. Work Unit no. (TRAIS)
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12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
The University of Michigan Sustainable Worldwide Transportation http://www.umich.edu/~umtriswt	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This white paper examines whether self-driving vehicles should be subjected to a licensing test as people are, and if so, whether the licensing process should be analogous to the current graduated driver licensing (GDL) systems for novice young drivers.

There are several arguments in support of the need for self-driving vehicles to pass a licensing test that would allow them to operate in all driving situations:

(1) Sensing hardware, spatial maps, and software algorithms will vary among manufacturers of self-driving vehicles, resulting in variability of on-road performance—as is the case with humans.

(2) Visual and sensing performance of self-driving vehicles in inclement weather is not yet sufficient.

(3) Visual-pattern recognition is a potential problem for current sensing systems in self-driving vehicles.

(4) Current self-driving vehicles have not yet been tested thoroughly under a variety of demanding conditions (e.g., in snow).

(5) On-road performance of some current self-driving vehicles is not yet perfect, even in good weather.

(6) Self-driving vehicles will face, on rare occasions, ethical dilemmas in their decision-making.

For self-driving vehicles, in contrast to novice human drivers, experience under one set of conditions that requires certain hardware or software capabilities does not improve performance under a different set of conditions that requires different hardware or software capabilities. Thus, the underlying logic for the use of GDL systems with novice young drivers does not apply to self-driving vehicles: A self-driving vehicle either has the hardware and software to deal with a particular situation, or it does not. If it does not, experience in other situations will not be of benefit.

On the other hand, the GDL approach would be applicable should a manufacturer explicitly decide to limit the operation of its vehicles to certain conditions, until improved hardware or software become available. For example, a manufacturer might feel confident that its vehicles could handle all situations except nighttime and snow. In such a situation, after passing a licensing test related to the limited conditions, the vehicle would be given a provisional license that would exclude nighttime driving and driving in snow. A full license could then be obtained once future updates to hardware or software are developed and made available, and the updated vehicle passes an unrestricted licensing test.

17. Key Words	18. Distribution Statement
Self-driving vehicles, driver licensing, graduated driver licensing	Unlimited

19. Security Classification (of this report)	20. Security Classification (of this page)	21. No. of Pages	22. Price
None	None	12	